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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/693,169	10/23/2003	Mark S. Wallace	020621	2628

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EXAMINER	
HALIYUR, VENKATESH N	

ART UNIT	PAPER NUMBER
2619	

NOTIFICATION DATE	DELIVERY MODE
01/09/2008	ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

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Office Action Summary	Application No.	Applicant(s)	
	10/693,169	WALLACE ET AL.	
	Examiner	Art Unit	
	Venkatesh Haliyur	2619	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *19 October 2007*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-39 (28,34 canceled),* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☒ Claim(s) *29-33 and 35-39* is/are allowed.

6)☒ Claim(s) *1-8,10-18,20-25 and 27* is/are rejected.

7)☒ Claim(s) *9,19 and 26* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Response to Amendment

1. The amendment filed on 10/19/2007 is insufficient to overcome the rejection of claims 1-27 communicated via office action of 6/19/2007. However, a new ground(s) of rejection has been made in view of a newly found reference Agee et al in this office action.

2. Claims 1-39 are pending in the application. Claims 28, 34 are canceled.

Claim Objections

3. Claim 25 is objected to because of the following informalities: In lines 3 and 4 of claim 25, recite claim limitations with acronyms TX and RX for transmitting and receiving spatial processors. However it is respectfully requested that the limitation be written in full form with acronyms (TX/RX) in parentheses. Appropriate correction is required to claim 25.

4. The numbering of claims is not in accordance with 37 CFR 1.126 which requires the original numbering of the claims to be preserved throughout the prosecution. When claims are canceled, the remaining claims must not be renumbered.

In the amendment of 10/19/2007, claim 32 is depending on a canceled claim 28 and claim 38 is depending on a canceled claim 34. Hence appropriate corrections are required to claims 32-33 and 38-39 .

Claim Rejections – 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

4. Claims 1-8,10-18, 20-25,27 are rejected under 35 U.S.C. 103(a) as being unpatentable over Boros et al [US Pat: 6,654,590] in view of Agee et al[US Pub:2004/0095907].

Regarding claims 1,18,24, Boros et al in the invention of "Determining a Calibration Function Using at Least One Remote Terminal" disclosed a method for calibrating downlink and uplink channels in a wireless communication system including an access point **(base station)**, a first subscriber set and a second subscriber set **(Figs 4-7)**, comprising: obtaining estimates of downlink channel responses for each of the first subscriber set and the second subscriber set **(col 20, lines 55-58)**; obtaining estimates of uplink channel responses for each of the first subscriber set and the second subscriber set **(col 20, lines 49-54)**; determining for each of the first subscriber set and

the second subscriber set first **(uplink weight vectors)** and second **(downlink weight vectors)** sets of correction factors **(weighted vectors)** based on the estimates of the downlink and uplink channel responses **(col 14, lines 30-60);** calibrating the downlink channel and uplink channel for the first subscriber and second subscriber sets based on each of the first and second sets of correction factors, respectively, to form a calibrated downlink channel and a calibrated uplink channel usable between the first subscriber set and the second subscriber set without further calibration; **(col 19, lines 46-67),** but Boros et al fails to teach establishing direct peer-to-peer communication between the first subscriber set and the second subscriber set the first without further calibration between them. However, Agee et al in the invention of "Method and Apparatus for Optimization of Wireless Multipoint Electromagnetic Communication Networks" disclosed a method for peer-to-peer communication between first and second sets of nodes in a wireless communication system without performing calibration on the transmit and receive channels of the subscriber sets (Fig 13B, col 29, lines 1-6, col 70, lines 49-57). Therefore it would have been obvious for one of ordinary skill in the art the time the invention was made to use the method of establishing peer-to-peer communication between first and second sets of nodes in a wireless communication system in the system of Boros et al for establishing peer-to-peer communication between first and second sets of nodes in a wireless communication system without performing on calibration on the transmit and receive channels of the subscriber sets. One is motivated as such in order to use the method of peer-to-peer communication to optimize capacity to provide two-way communication between

wireless nodes or adjacent cells in wireless LAN's.

Regarding claims 2, 22-23, Boros et al disclosed that the first set of correction factors **(uplink weight vectors)** is used to scale symbols prior **(pre-processing)** to transmission on the downlink channel **(col 19, lines 7-15)** and the second set of correction factors is used to scale symbols prior to transmission on the uplink channel **(col 17, lines 24-42)**.

Regarding claim 3, Boros et al disclosed that the first set of correction factors **(uplink weight vectors)** is used to scale symbols received on the downlink channel **(col 19, lines 1-6)** and the second set of correction factors **(downlink weight vectors)** is used to scale symbols received on the uplink channel **(col 17, lines 43-50)**

Regarding claim 4, Boros et al disclosed that the first and second sets of correction are determined based on the following equation: H_{dn} is a matrix for the estimate of the downlink channel response, H_{up} is a matrix for the estimate of the uplink channel response, K_{ap} is a matrix for the first set of correction factors, K_{ut} is a matrix for the second set of correction factors, and T denotes a transpose **(col 19, lines 13-33).**

Regarding claims 5-7,20-21,27, Boros et al disclosed determining the first and second sets of correction factors includes: computing a matrix C as an element-wise ratio of the matrix H_{up} over matrix H_{dn}, and deriving the matrices K_{ap} and K_{ut} based on the matrix C and the deriving the matrix K_{ut} includes normalizing each of a plurality of rows of the matrix C **(col 24, lines 46-67)** and determining a mean of the plurality of normalized rows of the matrix C, and wherein the matrix K_{ut} is formed based on the mean of the plurality of normalized rows and deriving the matrix K_{ap} includes

normalizing each of a plurality of columns of the matrix C, and determining a mean of inverses of the plurality of normalized columns of the matrix C **(col 25, lines 1-67)** and wherein the matrix K_{ap} is formed based on the mean of the inverses of the plurality of normalized columns **(col 29, lines 24-64)**.

Regarding claim 8, Boros et al disclosed wherein the matrices and based on a minimum mean square error (MMSE) computation **(col 14, lines 64-67, col 15, lines 1-30).**

Regarding claims 10-12, Boros et al disclosed determining a scaling value indicative of an average difference between the estimate of the downlink channel response and the estimate of the uplink channel response **(col 14, lines 49-60)** and wherein the estimates for the downlink and uplink channel responses are normalized to account for receiver noise floor **(SINR)** and wherein the determining is performed at a user terminal **(col 25, lines 14-46).**

Regarding claim 13, Boros et al disclosed wherein a first set of matrices of correction factors for the downlink channel is determined for a first set of subbands **(uplink subarray)** and interpolating the first set of matrices to obtain a second set of matrices of correction factors for the downlink channel for a second set of subbands **(downlink subarray, col 21, lines 9-35, col 29, lines 5-22)**.

Regarding claim 14, Boros et al disclosed that the estimates of the downlink and uplink channel responses are each obtained based on a pilot transmitted from a plurality of antennas and orthogonalized with a plurality of orthogonal sequences **(col 25, lines 49-67).**

Regarding claim 15, Boros et al disclosed that the estimate of the uplink channel response is obtained based on a pilot transmitted **(paging)** on the uplink channel and wherein the estimate of the downlink channel response is obtained based on a pilot transmitted on the downlink channel **(col 20, lines 40-58).**

Regarding claims 16-17, Boros et al disclosed that the TDD system is a multiple-input multiple-output **(multiple transmit/receive antenna arrays)** system and wherein the TDD system utilizes orthogonal frequency division multiplexing **(col 12, lines 47-67).**

Regarding claim 25, Boros et al disclosed a user terminal in a wireless time division duplexed (TDD) communication system **(Figs 1-5),** comprising: an TX spatial processor **(item 135 of Fig 1, col 12, lines 42-67)** operative to transmit a first pilot **(paging)** on an uplink channel; an RX spatial processor **(item 111 of Fig 1, col 13, lines 1-14)** operative to receive a second pilot on a downlink channel and derive an estimate of a downlink channel response based on the received second pilot, and to receive an estimate of an uplink channel response derived based on the transmitted first pilot **(col 19, lines 52-67)**; and a controller operative to determine first and second sets of correction factors based on the estimates of the downlink and uplink channel responses **(col 20, lines 49-58)**, wherein a calibrated downlink channel is formed by using the first set of correction factors **(uplink weight vectors)** for the downlink channel and a calibrated uplink channel is formed by using the second set of correction factors **(uplink weight vectors)** for the uplink channel **(col 19, lines 1-37).**

Allowable Subject Matter

5. Claims 29-33, 35-39 are allowed over prior art if minor informalities to claims 32-33, 38-39 as noted in claim objections above are overcome.

6. Claims 9, 19, 26 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Response to Arguments

7. Applicant's arguments, see remarks filed on 10/19/2007 with respect to claim 1-28 have been considered but are moot in view of the new ground(s) of rejection.

Conclusion

8. Any inquiry concerning this communication or earlier communications should be directed to the attention to Venkatesh Haliyur whose phone number is 571-272-8616. The examiner can normally be reached on Monday-Friday from 9:00AM to 5:00 PM. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Edan Orgad can be reached @ (571)-272-7884. Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the group receptionist whose telephone number is (571)-272-2600 or fax to 571-273-8300.

9. Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197(toll-free).

Venkatesh Haliyur

Patent Examiner

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